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CHAPTER II

Practitioner's Docket No. 915,399

Preliminary Classification.

Proposed Class:

Subclass:

NOTE: "All applicants are requested to include a preliminary classification on newly filed patent applications. The preliminary classification, preferably class and subclass designations, should be identified in the upper right-hand corner of the letter of transmittal accompanying the application papers, for example 'Proposed Class 2, subclass 129' " M.P.E.P., § 601, 7th ed.

TRANSMITTAL LETTER TO THE UNITED STATES ELECTED OFFICE (EO/US)

(ENTRY INTO U.S. NATIONAL PHASE UNDER CHAPTER II)

PCT/EP00/03699

26 April 2000

12 May 1999

INTERNATIONAL APPLICATION NO

INTERNATIONAL FILING DATE

PRIORITY DATE CLAIMED

Method for Transmitting Signals from a Plurality of Base Stations to a Mobile
TITLE OF INVENTION Station

APPLICANT(S)

Antti TOSKALA

Box PCT

Assistant Commissioner for Patents

Washington D.C. 20231

ATTENTION: EO/US

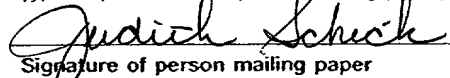
CERTIFICATION UNDER 37 C.F.R. § 1.10*(Express Mail label number is **mandatory**.)

(Express Mail certification is optional.)

I hereby certify that this Transmittal Letter and the papers indicated as being transmitted therewith is being deposited with the United States Postal Service on this date November 13, 2001, in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number EV 005523199 US, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

Judith Schick

(type or print name of person mailing paper)



Signature of person mailing paper

WARNING: Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F.R. § 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.

***WARNING:** Each paper or fee filed by "Express Mail" **must** have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 C.F.R. § 1.10(b).

"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will **not** be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.

(Transmittal Letter to the United States Elected Office (EO/US) [13-18]—page 1 of 8)

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NOTE: To avoid abandonment of the application, the applicant shall furnish to the USPTO, not later than 20 months from the priority date: (1) a copy of the international application, unless it has been previously communicated by the International Bureau or unless it was originally filed in the USPTO; and (2) the basic national fee (see 37 C.F.R. § 1.492(a)). The 30-month time limit may not be extended. 37 C.F.R. § 1.495.

WARNING: Where the items are those which can be submitted to complete the entry of the international application into the national phase are subsequent to 30 months from the priority date the application is still considered to be in the international state and if mailing procedures are utilized to obtain a date the express mail procedure of 37 C.F.R. § 1.10 must be used (since international application papers are not covered by an ordinary certificate of mailing—See 37 C.F.R. § 1.8).

NOTE: Documents and fees must be clearly identified as a submission to enter the national state under 35 U.S.C. § 371 otherwise the submission will be considered as being made under 35 U.S.C. § 111. 37 C.F.R. § 1.494(f).

- I. Applicant herewith submits to the United States Elected Office (EO/US) the following items under 35 U.S.C. § 371:
- ☒ This express request to immediately begin national examination procedures (35 U.S.C. § 371(f)).
 - ☒ The U.S. National Fee (35 U.S.C. § 371(c)(1)) and other fees (37 C.F.R. § 1.492) as indicated below:

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2. Fees

CLAIMS FEE	(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) CALCULATIONS
<input checked="" type="checkbox"/>	TOTAL CLAIMS	23 - 20 =	3	$\times \$18.00 =$	\$ 54.00
	INDEPENDENT CLAIMS	3 - 3 =	0	$\times 84.00$	
	MULTIPLE DEPENDENT CLAIM(S) (if applicable) + 280.00				
BASIC FEE**	<input type="checkbox"/> U.S. PTO WAS INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where an International preliminary examination fee as set forth in § 1.482 has been paid on the international application to the U.S. PTO: <input type="checkbox"/> and the international preliminary examination report states that the criteria of novelty, inventive step (non-obviousness) and industrial activity, as defined in PCT Article 33(1) to (4) have been satisfied for all the claims presented in the application entering the national stage (37 C.F.R. § 1.492(a)(4)) 100 <input type="checkbox"/> and the above requirements are not met (37 C.F.R. § 1.492(a)(1)) 710 <input checked="" type="checkbox"/> U.S. PTO WAS NOT INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where no international preliminary examination fee as set forth in § 1.482 has been paid to the U.S. PTO, and payment of an international search fee as set forth in § 1.445(a)(2) to the U.S. PTO: <input type="checkbox"/> has been paid (37 C.F.R. § 1.492(a)(2)) 740 <input type="checkbox"/> has not been paid (37 C.F.R. § 1.492(a)(3)) 1040 <input checked="" type="checkbox"/> where a search report on the international application has been prepared by the European Patent Office or the Japanese Patent Office (37 C.F.R. § 1.492(a)(5)) 890				890.00
	Total of above Calculations =				944.00
SMALL ENTITY	Reduction by 1/2 for filing by small entity, if applicable. Affidavit must be filed also. (note 37 C.F.R. § 1.9, 1.27, 1.28)				-
	Subtotal				
	Total National Fee				\$ 944.00
	Fee for recording the enclosed assignment document \$40.00 (37 C.F.R. § 1.21(h)). (See Item 13 below). See attached "ASSIGNMENT COVER SHEET".				
TOTAL	Total Fees enclosed				\$ 944.00

*See attached Preliminary Amendment Reducing the Number of Claims.

- i. ☒ A check in the amount of \$944.00 to cover the above fees is enclosed.
 ii. ☐ Please charge Account No. _____ in the amount of \$ _____.
 A duplicate copy of this sheet is enclosed.

****WARNING:** "To avoid abandonment of the application the applicant shall furnish to the United States Patent and Trademark Office not later than the expiration of 30 months from the priority date: * * * (2) the basic national fee (see § 1.492(a)). The 30-month time limit may not be extended." 37 C.F.R. § 1.495(b).

WARNING: If the translation of the international application and/or the oath or declaration have not been submitted by the applicant within thirty (30) months from the priority date, such requirements may be met within a time period set by the Office. 37 C.F.R. § 1.495(b)(2). The payment of the surcharge set forth in § 1.492(e) is required as a condition for accepting the oath or declaration later than thirty (30) months after the priority date. The payment of the processing fee set forth in § 1.492(f) is required for acceptance of an English translation later than thirty (30) months after the priority date. Failure to comply with these requirements will result in abandonment of the application. The provisions of § 1.136 apply to the period which is set. Notice of Jan. 3, 1993, 1147 O.G. 29 to 40.

3. ☒ A copy of the International application as filed (35 U.S.C. § 371(c)(2)):

NOTE: Section 1.495 (b) was amended to require that the basic national fee and a copy of the international application must be filed with the Office by 30 months from the priority date to avoid abandonment. "The International Bureau normally provides the copy of the international application to the Office in accordance with PCT Article 20. At the same time, the International Bureau notifies applicant of the communication to the Office. In accordance with PCT Rule 47.1, that notice shall be accepted by all designated offices as conclusive evidence that the communication has duly taken place. Thus, if the applicant desires to enter the national stage, the applicant normally need only check to be sure the notice from the International Bureau has been received and then pay the basic national fee by 30 months from the priority date." Notice of Jan. 7, 1993, 1147 O.G. 29 to 40, at 35-36 See item 14c below.

- a. ☐ is transmitted herewith.
 b. ☐ is not required, as the application was filed with the United States Receiving Office.
 c. ☒ has been transmitted
 i. ☒ by the International Bureau.
 Date of mailing of the application (from form PCT/1B/308): 23 Nov 2000
 ii. ☐ by applicant on _____
 Date

4. ☒ A translation of the International application into the English language (35 U.S.C. § 371(c)(2)):

- a. ☐ is transmitted herewith.
 ✓ b. ☒ is not required as the application was filed in English.
 c. ☐ was previously transmitted by applicant on _____
 Date
 d. ☐ will follow.

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5. ☐ Amendments to the claims of the International application under PCT Article 19 (35 U.S.C. § 371(c)(3)):

NOTE. The Notice of January 7, 1993 points out that 37 C.F.R. § 1.495(a) was amended to clarify the existing and continuing practice that PCT Article 19 amendments must be submitted by 30 months from the priority date and this deadline may not be extended. The Notice further advises that "The failure to do so will not result in loss of the subject matter of the PCT Article 19 amendments. Applicant may submit that subject matter in a preliminary amendment filed under section 1.121. In many cases, filing an amendment under section 1.121 is preferable since grammatical or idiomatic errors may be corrected." 1147 O.G. 29-40, at 36

- a. ☐ are transmitted herewith.
 - b. ☐ have been transmitted
 - i. ☐ by the International Bureau.
Date of mailing of the amendment (from form PCT/1B/308): _____.
 - ii. ☐ by applicant on (date) _____.
Date
 - c. ☐ have not been transmitted as
 - i. ☐ applicant chose not to make amendments under PCT Article 19.
Date of mailing of Search Report (from form PCT/ISA/210): _____.
 - ii. ☐ the time limit for the submission of amendments has not yet expired.
The amendments or a statement that amendments have not been made will be transmitted before the expiration of the time limit under PCT Rule 46.1.
6. ☐ A translation of the amendments to the claims under PCT Article 19 (38 U.S.C. § 371(c)(3)):
- a. ☐ is transmitted herewith.
 - b. ☐ is not required as the amendments were made in the English language.
 - c. ☐ has not been transmitted for reasons indicated at point 5(c) above.
7. ☐ A copy of the international examination report (PCT/IPEA/409)
- ☐ is transmitted herewith.
 - ☐ is not required as the application was filed with the United States Receiving Office.
8. ☐ Annex(es) to the international preliminary examination report
- a. ☐ is/are transmitted herewith.
 - b. ☐ is/are not required as the application was filed with the United States Receiving Office.
9. ☐ A translation of the annexes to the international preliminary examination report
- a. ☐ is transmitted herewith.
 - b. ☐ is not required as the annexes are in the English language.

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10. ☒ An oath or declaration of the inventor (35 U.S.C. § 371(c)(4)) complying with 35 U.S.C. § 115

- a. ☐ was previously submitted by applicant on _____
Date
- b. ☐ is submitted herewith, and such oath or declaration
 - i. ☐ is attached to the application.
 - ii. ☐ identifies the application and any amendments under PCT Article 19 that were transmitted as stated in points 3(b) or 3(c) and 5(b); and states that they were reviewed by the inventor as required by 37 C.F.R. § 1.70.
- c. ☒ will follow.

II. Other document(s) or information included:

11. ☒ An International Search Report (PCT/ISA/210) or Declaration under PCT Article 17(2)(a):

- a. ☐ is transmitted herewith.
- b. ☒ has been transmitted by the International Bureau.
Date of mailing (from form PCT/IB/308): 23 Nov. 2000
- c. ☐ is not required, as the application was searched by the United States International Searching Authority.
- d. ☐ will be transmitted promptly upon request.
- e. ☐ has been submitted by applicant on _____
Date

12. ☒ An Information Disclosure Statement under 37 C.F.R. §§ 1.97 and 1.98:

- a. ☒ is transmitted herewith.
Also transmitted herewith is/are:
 - ☒ Form PTO-1449 (PTO/SB/08A and 08B).
 - ☒ Copies of citations listed.
- b. ☐ will be transmitted within THREE MONTHS of the date of submission of requirements under 35 U.S.C. § 371(c).
- c. ☐ was previously submitted by applicant on _____
Date

13. ☐ An assignmer. document is transmitted herewith for recording.

A separate ☐ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.

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14. ☐ Additional documents:
- a. ☒ Copy of request (PCT/RO/101)
 - b. ☒ International Publication No. WO 00/70785
 - i. ☒ Specification, claims and drawing
 - ii. ☐ Front page only
 - c. ☒ Preliminary amendment (37 C.F.R. § 1.121)
 - d. ☐ Other

15. ☒ The above checked items are being transmitted
- a. ☒ before 30 months from any claimed priority date.
 - b. ☐ after 30 months.
16. ☐ Certain requirements under 35 U.S.C. § 371 were previously submitted by the applicant on _____, namely:

AUTHORIZATION TO CHARGE ADDITIONAL FEES

WARNING: Accurately count claims, especially multiple dependant claims, to avoid unexpected high charges if extra claims are authorized.

NOTE: "A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 C.F.R. § 1.136(a)(3).

NOTE: "Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 C.F.R. § 1.26(a).

- ☒ The Commissioner is hereby authorized to charge the following additional fees that may be required by this paper and during the entire pendency of this application to Account No. 23-0442.

☒ 37 C.F.R. § 1.492(a)(1), (2), (3), and (4) (filing fees)

WARNING: Because failure to pay the national fee within 30 months without extension (37 C.F.R. § 1.495(b)(2)) results in abandonment of the application, it would be best to always check the above box.

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☐ 37 C.F.R. § 1.492(b), (c) and (d) (presentation of extra claims)

NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 C.F.R. § 1.492(d)), it might be best not to authorize the PTO to charge additional claim fees, except possible when dealing with amendments after final action.

☐ 37 C.F.R. § 1.17 (application processing fees)

☐ 37 C.F.R. § 1.17(a)(1)-(5) (extension fees pursuant to § 1.136(a).

☐ 37 C.F.R. § 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. § 1.311(b))

NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 C.F.R. § 1.311(b)

NOTE: 37 C.F.R. § 1.28(b) requires "Notification of any change in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying . . . issue fee." From the wording of 37 C.F.R. § 1.28(b): (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.

☐ 37 C.F.R. § 1.492(e) and (f) (surcharge fees for filing the declaration and/or filing an English translation of an International Application later than 30 months after the priority date).


SIGNATURE OF PRACTITIONER

Alfred A. Fressola

(type or print name of practitioner)

Ware, Fressola, Van Der Sluys & Adolphson LLP

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PATENT
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the matter of:	Toskala)	
)	
Serial No:)	Group Art Unit
)	Examiner:
Filed:	Herewith)	
)	
International No.	PCT/EP00/03699)	
)	
International Filing Date:	26 April 2000)	
)	
For:	Method for Transmitting Signals)	
	from a Plurality of Base Stations)	
	to a Mobile Stations)	

ASSISTANT COMMISSIONER OF PATENTS
WASHINGTON, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

Please preliminarily amend the above referenced application as follows:

In the Specification:

Please replace paragraph beginning at line 1 of page 3 with the following rewritten paragraph:

--According to a first aspect of the present invention, there is provided a method of transmitting signals from a plurality of first stations to the same second station, the method comprising the steps of transmitting first signals comprising a first communication and first associated information from one of the plurality of first stations to the; second station

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transmitting second signals comprising the first communication, a second communication and second associated information, the second associated information differing at least partially from the first associated information, from another of the plurality of first stations to the second station; and receiving at the second station the first and second signals, wherein the second station processes the first and second signals in accordance with the first and second associated information.

Paragraph beginning at line 26 of page 4 through line 10 of page 5 has been amended as follows:

According to a second aspect of the present invention, there is provided a network comprising a plurality of first stations and a plurality of second stations, each of the first stations being connected to a control element, wherein at least one of the first stations is connected to one control element and at least one of the first stations being connected to a different control element, wherein, in a first mode, when a second station is in communication with a plurality of first stations controlled by the same control element, the first stations transmit identical control information to the second station and, in a second mode, when a second station is in communication with a plurality of first stations which are controlled by a plurality of different control elements, the control information transmitted by the first stations to the second station is different, the control information being used by the second station in the first and second modes to control the processing carried out by the second station in respect of signals received from the plurality of first stations.

Paragraph beginning at line 14 of page 5 has been amended as follows:

The first coding may have a first number of symbols available using a first number of bits and the second coding may have a second number of symbols available using a second number of bits, wherein the first number of symbols is greater than the second number of symbols. The control information may comprise a first number of code words in the first mode and a second number of code words in the second mode, the first number of code words being less than the second number of code words. For example, one code word may be used in the first mode and two or more code words may be used in the second mode.

In the Claims:

Please amend claims 4 - 13, 15 and 17 - 21 as follows:

4. (Amended) A method as claimed in claim 1, wherein said first communication is provided on dedicated channels.

5. (Amended) A method as claimed in claim 1, wherein said second communication is data.

6. A method as claimed in claim 1, wherein said second communication is provided in a shared channel.

1 7. (Amended) A method as claimed in claim 1, wherein said first and/or said
2 second associated information comprise information on the rate of the respective first and
3 second signals.

1 8. (Amended) A method as claimed in claim 1, wherein said first and/or said
2 second associated information comprise at least one code word.

1 9. (Amended) A method as claimed in claim 1, wherein said first and/or said
2 second associated information comprises first information associated with the first
3 communication and second information associated with the second communication.

1 10. (Amended) A method as claimed in claim 1, wherein first and second
2 associated information comprise the same information in respect of the first communication.

1 11. (Amended) A method as claimed in claim 1, wherein one of said first and
2 second stations comprises a base station.

1 12. (Amended) A method as claimed in claim 1, wherein one of said first and
2 second stations comprises a mobile station.

1 13. (Amended) A method as claimed in claim 1, wherein said first and second
2 stations communicate using the code division multiple access technique.

1 15. (Amended) A method as claimed in claim 1, wherein at least two of said first
2 stations are connected to different control elements, said control elements defining the first
3 and/or second associated information.

1 17. (Amended) A network comprising a plurality of first stations and a plurality
2 of second stations, each of said first stations being connected to a control element, wherein at
3 least one of said first stations is connected to one control element and at least one of the first
4 stations being connected to a different control element, wherein, in a first mode, when a
5 second station is in communication with a plurality of first stations controlled by the same
6 control element, the first stations transmit identical control information to said second station
7 and, in a second mode, when a second station is in communication with a plurality of first
8 stations which are controlled by a plurality of different control elements, the control
9 information transmitted by said first stations to said second station is different.

1 18. (Amended) A network as claimed in claim 17, wherein said control
2 information being used by said second station in said first and second modes is to control the
3 processing carried out by the second station in respect of signals received from said plurality
4 of first stations.

19. (Amended) A network as claimed in claim 17, wherein said control information is in accordance with a first coding in the first mode and in accordance with a second coding in the second mode.

20. (Amended) A network as claimed in claim 17, wherein said first coding has a first number of symbols available using a first number of bits and said second coding has a second number of symbols available using a second number of bits, wherein said first number of symbols is greater than said second number of symbols.

21. (Amended) A network as claimed in claim 17, wherein the control information comprises a first number of code words in the first mode and a second number of code words in the second mode, said first number of code words being less than said second number of code words.

In the Abstract:

After the claim page 17, please add Abstract page:

--Abstract of the Disclosure

A method of transmitting signals from a plurality of first stations to the same second station, the method comprising the steps of transmitting first signals comprising a first communication and first associated information from one of the plurality of first stations to

the second station; transmitting second signals comprising the first communication, a second communication and second associated information, the second associated information differing at least partially from the first associated information, from another of the plurality of first stations to the second station; and receiving at the second station the first and second signals, wherein the second station processes the first and second signals in accordance with the first and second associated information.--

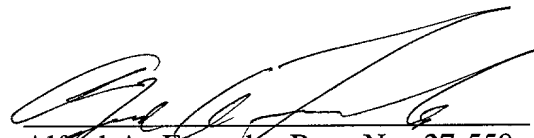
Remarks

This preliminary amendment is filed for the purpose of placing the application into standard U.S. format. Claims 4 - 13, 15 and 17 - 21 have been amended.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "**Version with markings to show changes made**".

Respectfully submitted,

Date: 12 Nov 01


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 Ware, Fressola, Van Der Sluys
 & Adolphson LLP
 Bradford Green, Building Five
 755 Main Street, PO Box 224
 Monroe, CT 06468
 (203) 261-1234

VERSION WITH MARKINGS TO SHOW CHANGES MADE**In the Specification:**

Paragraph beginning at line 1 of page 3 has been amended as follows:

According to a first aspect of the present invention, there is provided a method of transmitting signals from a plurality of first stations to the same second station, [said] the method comprising the steps of transmitting first signals comprising a first communication and first associated information from one of [said] the plurality of first stations to [said] the; second station transmitting second signals comprising [said] the first communication, a second communication and second associated information, [said] the second associated information differing at least partially from [said] the first associated information, from another of [said] the plurality of first stations to [said] the second station; and receiving at [said] the second station [said] the first and second signals, wherein [said] the second station processes [said] the first and second signals in accordance with the first and second associated information.

Paragraph beginning at line 26 of page 4 through line 10 of page 5 has been amended as follows:

According to a second aspect of the present invention, there is provided a network comprising a plurality of first stations and a plurality of second stations, each of [said] the first stations being connected to a control element, wherein at least one of [said] the first stations is connected to one control element and at least one of the first stations being connected to a different control element, wherein, in a first mode, when a second station is

in communication with a plurality of first stations controlled by the [some] same control element, the first stations transmit identical control information to [said] the second station and, in a second mode, when a second station is in communication with a plurality of first stations which are controlled by a plurality of different control elements, the control

5 information transmitted by [said] the first stations to [said] the second station is different, [said] the control information being used by [said] the second station in [said] the first and second modes to control the processing carried out by the second station in respect of signals received from [said] the plurality of first stations.

Paragraph beginning at line 14 of page 5 has been amended as follows:

10 The first coding may have a first number of symbols available using a first number of bits and [said] the second coding may have a second number of symbols available using a second number of bits, wherein the first number of symbols is greater than the second number of symbols. The control information may comprise a first number of code words in the first mode and a second number of code words in the second mode, [said] the first number of

15 code words being less than the second number of code words. For example, one code word may be used in the first mode and two or more code words may be used in the second mode.

In the Claims:

Please amend claims 4 - 13, 15 and 17 - 21.

1 4. (Amended) A method as claimed in claim 1[, 2 or 3], wherein said first

2 communication is provided on dedicated channels.

1 5. (Amended) A method as claimed in [any preceding] claim 1, wherein said
2 second communication is data.

1 6. A method as claimed in [any preceding] claim 1, wherein said second
2 communication is provided in a shared channel.

1 7. (Amended) A method as claimed in [any of the preceding claims] claim 1,
2 wherein said first and/or said second associated information comprise information on the
3 rate of the respective first and second signals.

1 8. (Amended) A method as claimed in [any preceding] claim 1, wherein said
2 first and/or said second associated information comprise at least one code word.

1 9. (Amended) A method as claimed in [any preceding] claim 1, wherein said
2 first and/or said second associated information comprises first information associated with the
3 first communication and second information associated with the second communication.

1 10. (Amended) A method as claimed in [any preceding] claim 1, wherein first and
2 second associated information comprise the same information in respect of the first
3 communication.

1 11. (Amended) A method as claimed in [any one of the preceding claims] claim
2 1, wherein one of said first and second stations comprises a base station.

1 12. (Amended) A method as claimed in [any one of the preceding claims] claim
2 1, wherein one of said first and second stations comprises a mobile station.

1 13. (Amended) A method as claimed in [any one of the preceding claims] claim
2 1, wherein said first and second stations communicate using the code division multiple access
3 technique.

1 15. (Amended) A method as claimed in [any one of the preceding claims] claim
2 1, wherein at least two of said first stations are connected to different control elements, said
3 control elements defining the first and/or second associated information.

1 17. (Amended) A network comprising a plurality of first stations and a plurality
2 of second stations, each of said first stations being connected to a control element, wherein at
3 least one of said first stations is connected to one control element and at least one of the first
4 stations being connected to a different control element, wherein, in a first mode, when a
5 second station is in communication with a plurality of first stations controlled by the [some]
6 same control element, the first stations transmit identical control information to said second
7 station and, in a second mode, when a second station is in communication with a plurality of

8 first stations which are controlled by a plurality of different control elements, the control
9 information transmitted by said first stations to said second station is different.

1 18. (Amended) A network as claimed in claim 17, wherein said control
2 information being used by said second station in said first and second modes is to control the
3 processing carried out by the second station in respect of signals received from said plurality
4 of first stations.

1 19. (Amended) A network as claimed in claim 17 [or 18], wherein said control
2 information is in accordance with a first coding in the first mode and in accordance with a
3 second coding in the second mode.

1 20. (Amended) A network as claimed in claim 17[, 18 or 19], wherein said first
2 coding has a first number of symbols available using a first number of bits and said second
3 coding has a second number of symbols available using a second number of bits, wherein
4 said first number of symbols is greater than said second number of symbols.

1 21. (Amended) A network as claimed in claim 17[, 18, 19 or 20], wherein the
2 control information comprises a first number of code words in the first mode and a second
3 number of code words in the second mode, said first number of code words being less than
4 said second number of code words.

**METHOD FOR TRANSMITTING SIGNALS FROM A PLURALITY OF BASE
STATIONS TO A MOBILE STATION**

Field of the invention

The present invention relates to a transmitting method and in particular, but not exclusively, to a method of transmitting signals from a plurality of base stations to a mobile station in a wireless cellular telecommunications network.

Background of the invention

The use of code division multiple access (CDMA) is being proposed for the next generation of cellular telecommunication networks. Additionally, code division multiple access is also being used in the IS-95 Standard in the USA. CDMA is a direct sequence spread spectrum technique. In a wireless cellular network using CDMA, the mobile terminals in one cell associated with a first base station will use the same frequency as mobile stations in an adjacent cell associated with a second base station. The different mobile stations can be distinguished by the respective base stations as each mobile station will be using a different spreading code.

In US-A-5101501 a CDMA system is described which uses "soft" handoff. With soft handoff, a mobile station is capable of communicating with more than one base station at the same time. This will typically occur when the mobile station is close to the boundary defined between two cells. The signals sent by the mobile stations will be received and processed by both of the base stations. Likewise, the mobile station will receive the same signal from the two base stations. The signals from the two base stations may be combined. The combined signal may provide better quality than the individual signals received by the mobile station.

It has also been proposed that two parallel connections be

provided between a mobile station and a base station. One of these connections is for speech whilst the other is for data. The soft handoff scenario described hereinbefore has been proposed in the context of speech connections. The use of soft handoff with data is difficult to successfully implement and so it has been proposed that even if the mobile station is in soft handoff with two or more base stations for speech connections, the mobile station should only communicate with a single base station for the data connection.

The inventor has appreciated that this proposal has problems in certain soft handoff situations. These problems will occur when the two base stations with which a mobile station is in communication are under the control of different radio network controllers. The radio network controllers provide control information to the base stations for forwarding to a mobile station. This information indicates if speech and/or data is present and associated rate information. For successful combining in the mobile station when in soft handoff, this information should not contradict. If one base station under the control of one radio network controller indicates that speech and data are being sent to the mobile station and a second base station under the control of a different radio network controller indicates to the same mobile station that only speech is being sent to the mobile station, the mobile station will not be able to successfully combine the received speech. The mobile station may also assume that there is no data information as the mobile station has only been advised that there is data information by one base station. As this information is only received from one base station, the mobile station may assume that the information from the base station is unreliable and that there is in fact no data.

EP-A-0 577 322 describes a method for call handover in a cellular radio system using soft handover, whereby during the transitional period in which the mobile station switches base

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station, the mobile station is in communication with both base stations on different channels.

Summary of the invention

It is an aim of embodiments of the present invention to address this problem.

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According to a first aspect of the present invention, there is provided a method of transmitting signals from a plurality of first stations to the same second station, said method comprising the steps of transmitting first signals comprising a first communication and first associated information from one of said plurality of first stations to said second station; transmitting second signals comprising said first communication, a second communication and second associated information, said second associated information differing at least partially from said first associated information, from another of said plurality of first stations to said second station; and receiving at said second station said first and second signals, wherein said second station processes said first and second signals in accordance with the first and second associated information.

The first communication or type of communication may comprise speech. Alternatively, the first communication may comprise any other suitable data. As the first communication is transmitted by two different first stations to the same second station, the second station is in soft handoff with respect to the first communication. The first communications may be provided on dedicated channels. Alternatively, the first communications may be provided on shared channels.

The second communication or type of communication may be data or any other suitable information. The second communication is only provided by one of the first stations to the second station. Accordingly, that second communication is not in a soft handoff situation with respect to the second communication. Preferably, the second communication is provided in a shared channel. Alternatively, a dedicated channel may be provided for the second communication.

The first and/or second associated information may comprise information on the rate of the respective first and second signals. Alternatively or additionally, the first and/or second

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associated information may comprise information which is required in order to successfully process the received signals.

Preferably, the first and/or second associated information may comprise at least one code word. Preferably, a code word is provided for the first communication and a different code word is provided for the second communication.

The first and/or second associated information may comprise first information associated with the first communication and second information associated with the second communication. As mentioned hereinbefore, that first and second information may comprise respective code words. Preferably, the first and second associated information comprises the same information in respect of the first communication.

One of the first and second stations may comprise a base station. Preferably, one of the first and second stations comprises a mobile station. The first stations are preferably base stations and the second station is preferably a mobile station.

In preferred embodiments of the present invention, the first and second stations communicate using the code division multiple access technique. The first and second communications may use different spreading codes.

At least two of the first stations may be connected to different control elements, the control elements defining the first and/or second associated information. These control elements may be radio network controllers.

According to a second aspect of the present invention, there is provided a network comprising a plurality of first stations and a plurality of second stations, each of said first stations being connected to a control element, wherein at least one of said first stations is connected to one control element and at least one of the first stations being connected to a different control element, wherein, in a first mode, when a second station is in communication with a plurality of first stations controlled by

the same control element, the first stations transmit identical control information to said second station and, in a second mode, when a second station is in communication with a plurality of first stations which are controlled by a plurality of different control elements, the control information transmitted by said first stations to said second station is different, said control information being used by said second station in said first and second modes to control the processing carried out by the second station in respect of signals received from said plurality of first stations.

The control information may be in accordance with the first coding in the first mode and in accordance with the second coding in the second mode.

The first coding may have a first number of symbols available using a first number of bits and said second coding may have a second number of symbols available using a second number of bits, wherein the first number of symbols is greater than the second number of symbols. The control information may comprise a first number of code words in the first mode and a second number of code words in the second mode, said first number of code words being less than the second number of code words. For example, one code word may be used in the first mode and two or more code words may be used in the second mode.

Preferably, the number of bits defining the or each code word in the first mode is different to that of the or each code word in the second mode. The number of bits in the first mode for a code word is preferably greater than that in the second mode.

Brief description of the drawings

For a better understanding of the present invention and as to how the same may be carried into effect, reference will now be made by way of example to the accompanying drawings in which:

Figure 1 shows a schematic diagram of part of a cellular telecommunications network incorporating base transceiver

stations and mobile stations;

Figure 2 shows part of the network of Figure 1 in more detail;
and

Figure 3 illustrates the coding used in embodiments of the
present invention.

Detailed description of embodiments of the invention

Reference will first be made to Figure 1 in which three cells 2 of a cellular telecommunications network are shown. Each cell 2 is served by a respective base transceiver station (BTS) 4. Each base transceiver station 4 is arranged to transmit signals to and receive signals from the mobile stations 6 located in the cell associated with the given base transceiver station 4. Likewise, each mobile station 6 is able to transmit signals to and receive signals from the respective base transceiver station 4.

The cellular telecommunications network shown in Figure 1 uses a code division multiple access technique. Accordingly, at least some of the mobile stations will be in communication with more than one base station at the same time. This, however, will be described in more detail hereinafter.

Reference is now made to Figure 2 which shows two base stations 10 and 12 which serve adjacent cells. The first base station 10 is connected to a first radio network controller 14 whilst the second base station 12 is connected to a second radio network controller 16. In practice each of the first and second radio network controllers 14 and 16 will be connected to more than one base station. However for clarity, only one base station is shown as being connected to each radio network controller.

In the scenario illustrated in Figure 2, a mobile station 18 is in communication with both the first and the second base stations 10 and 12 at the same time and is therefore in soft handoff. The cells of the first and second base stations can be regarded as overlapping with the mobile station 18 being in the region of overlap.

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The mobile station 18 has a downlink speech connection 20 and a downlink data connection 22 with the first base station 10, these connections being in parallel. The speech connections may, but not necessarily be a dedicated connection and is sometimes referred to as a downlink channel. The data connection via these embodiments is a downlink shared channel and is also used by the first base station 10 for other communications with different mobile stations. Alternatively, the data connection may be a dedicated channel. The speech and data connections use different spreading codes so that the two connections (channels) can be distinguished. The spreading factor (i.e. processing gain) may also differ for the speech and data connections.

Control information for the mobile station 18 from the first base station 10 is multiplexed with the speech on the speech connection and therefore uses the same code as the speech connection.

The mobile station 18 has a downlink speech connection 24 with the second base station 12 and no data connection. The speech connection 24 between the mobile station 18 and the second base station 12 uses the same spreading factor as the speech connection between the first base station 10 and the mobile station 18. Once again, the control information will be multiplexed with speech on the speech connection and a single spreading code is used. The speech connection may be regarded as a dedicated physical data channel whilst the control information may be regarded as being provided by a dedicated physical control channel.

Whilst the speech information transmitted by the first and second base stations 10 and 12 to the mobile stations is the same, the control information may be the same or different. The control information includes information such as power control information for controlling the power with which the mobile station 18 transmits. The control information also includes TFCI information as will be discussed hereinafter. The control

information may include pilot signals or symbols which act as a reference for certain purposes.

The control information is time multiplexed onto the speech channel (i.e. the dedicated downlink physical channel) and thus uses the same spreading code.

Data blocks are transmitted between the radio network controllers 14 and 16 and the respective base stations 10 and 12 using a frame protocol FP. The data may be speech or conventional data. A frame contains data which is to be transmitted in one interleaving period and a transport format indicator TFI. The interleaving period is the period over which data is interleaved. The transport format indicator TFI provides information as to the format of the data frame such as the size of the data block, the interleaving period and the like.

Each mobile station has an independent transport connection which means that each frame contains the data and current transport format indicator TFI of one bearer only. One bearer is the speech, another bearer is the data and yet another bearer is the signalling. For downlink communications (from the radio network controller to the base station direction), the data blocks of users having the same user equipment are multiplexed onto a single radio link. The manner in which the multiplexing is done will depend on the transport format indicator TFI of each frame which indicates the amount of data in each frame for the bearers. The multiplexing takes place with the blocks which are to use the same spreading code.

A transport format combination information TFCI field of the radio frame provided in a dedicated physical control channel DPCCCH will indicate the manner in which the multiplexing is carried out. The transport format combination information TFCI field will indicate the transport format indicator TFI for each of the bearers whose data is multiplexed in the radio frame or frames in the dedicated physical data channel DPDCH. Each frame has incorporates two code slots, one for shared channels and one for the unshared channels. The TFCI information provides

information on the rate associated with the speech and data respectively.

The rate information thus defines the interleaving performed as well as the form of channel coding.

When the mobile station 18 is in communication with two base stations 10 and 12 which are controlled by different radio network controllers 14 and 16, the TCFI coding is modified as follows. A first type of coding is used for the TCFI coding in this scenario. In this embodiment 16.5 coding is used. This means that there are 16 possible symbols which are represent by 5 bits.

Each of the base stations will send one or two code words, each having a maximum length of 5 bits. These code words are formulated by the respective radio network controller. Reference is made to Figure 3 which shows four examples of the two words which are received by the mobile station. The first word, WORD 1, is transmitted by both the first base station 10 and the second base station and relates to the speech connection. The same information WORD 1 for the speech connections will be sent to the mobile station 18 from the first and second base stations 10 and 12. This is because the same speech information is sent to the mobile station from both the first and second base stations 10 and 12.

A second word WORD 2 relates to any data connection. The first base station 10 sends WORD 2 to the mobile station 16. As there is no data connection between the second base station and mobile station 18 one of the following occurs: instead of a second code word, WORD 2, the second base station sends a series of zeros or the like, representing the second word. Alternatively, the second base station may not send the second word WORD 2. Accordingly, the mobile station may only receive one version of the second code word, WORD 2 from the first base station or a second version with zeros or the like. In the latter case, the two second words WORD 2 can be combined so the effects of the connection where there is no data are ignored. This may be used to confirm that there is only one data connection.

The first word contains the TCFI information for the speech connection between the first base station 10 and the mobile station 18 and between the second base station 2 and the mobile station 18. The TCFI information is the same from both the first and the second base stations.

The second word contains TCFI information for the data connection between the first base station 10 and the mobile station 18. There is no TCFI information from the second base station 12 for a data connection.

Figure 3 shows examples where the total number of TCFI bits received by the mobile station is 7, 8, 9 and 10. As can be seen from these examples, it is not necessary to use all of the available bits of each code word. For example, in one version of the second word, WORD 2, all bits are used, in another four bits, in another three bits and in another two bits. Only one bit may also be used. The position of the unused bit or bits may vary. The first word, WORD 1 may vary. The first word, WORD 1 may similarly use only some of the available bits.

The mobile station uses the TCFI information in order to process the speech and data connections as required. For example, the rate information may mean the speech or data has been interleaved and encoded in a certain manner. The mobile station uses the rate information to determine the deinterleaving process and decoding to be carried out.

Where the mobile station is in communication with two base stations which are controlled by the same radio network controller, the mobile station receives the same TCFI information from both of the base stations for each connection. The TCFI information will use a different coding. In this embodiment the different coding will be 32.6 coding. This means that there are 32 possible symbols which are represented by 6 bits. There is of course only a single code word of six bits which is transmitted by each of the base stations.

In alternative embodiments of the present invention, other types of coding can be used.

Embodiments of the present invention have the advantage that where two radio network controllers are involved, one of which controls the downlink channel and the other of which controls the downlink shared channel, the benefits of fast signalling on the downlink shared channel can be retained even where the radio network controllers are in different locations.

The data connection TCFI code word (which may be in respect of a shared channel) will not have the gain associated with soft handoff but this also applies to the data itself.

This method described with reference to Figure 3 has the advantage that a control loop between radio network controllers is not required, reducing traffic in the network.

The signalling information i.e. the TCFI information relating to the speech connection will have the same soft handoff gain associated with the speech connection.

There is an alternative solution to the problem where different base stations which are in communication with the same mobile station and the base stations are controlled by different radio network controllers. That solution is to connect the two radio network controllers to each other so that the same TCFI coding is sent by both of the base stations. This solution may be advantageous where the radio network controllers are in the same location. If the radio network controllers are not in the same location, this solution may be disadvantageous in that a delay is introduced. This delay is a result of the time taken for the two radio network controllers to signal to each other before transmission can begin.

In one embodiment of the present invention the method described in relation to Figure 3 is used if the radio network controllers

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are not in the same location whilst the alternative method is used if the radio network controllers are in the same location. In other embodiments the method described in relation to Figure 3 is used regardless of the location of the radio network controllers in question.

The format described hereinbefore is part of the currently proposed UMTS (universal mobile telephone service) standard. It should be appreciated that any other standard can alternatively be used.

The control information can in alternative embodiments of the present invention be sent on a separate connection or channel to the speech data.

In alternative embodiments of the present invention, the speech may be replaced by any other suitable form of communication. In other words, any other suitable communication type including some data connections may be in soft handoff as required and used in embodiments of the invention. Likewise, the data can be replaced by any other suitable form of communication, where soft handoff is not desirable. The data may be packet data or any other type of data.

It is also possible that the dedicated channel is only maintained to support handover or the like and only contain signalling information. In this case the first word WORD 1, would refer to the existence of the higher level control information.

In some embodiments of the present invention, the mobile station may be in communication with more than two base stations at the same time. The principles outlined hereinbefore can also be used in this scenario. Each base station can be connected to a different radio network controller. Alternatively, one or more of the radio network controllers can be connected to more than one base station which is in communication with the same mobile station.

Whilst preferred embodiments have been described in the context of a code division multiple access system, embodiments of the present invention can be used with any other spread spectrum technique or any other suitable access technique such as time division multiple access, frequency division multiple and space division multiple access as well as hybrids thereof.

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signals.

8. A method as claimed in any preceding claim, wherein said first and/or said second associated information comprise at least one code word.

9. A method as claimed in any preceding claim, wherein said first and/or said second associated information comprises first information associated with the first communication and second information associated with the second communication.

10. A method as claimed in any preceding claim, wherein first and second associated information comprise the same information in respect of the first communication.

11. A method as claimed in any one of the preceding claims, wherein one of said first and second stations comprises a base station.

12. A method as claimed in any one of the preceding claims, wherein one of said first and second stations comprises a mobile station.

13. A method as claimed in any one of the preceding claims, wherein said first and second stations communicate using the code division multiple access technique.

14. A method as claimed in claim 13 wherein said first and second communications use different spreading codes.

15. A method as claimed in any one of the preceding claims wherein at least two of said first stations are connected to different control elements, said control elements defining the first and/or second associated information.

16. A method as claimed in claim 15, wherein said elements comprise radio network controllers.

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17. A network comprising a plurality of first stations and a plurality of second stations, each of said first stations being connected to a control element, wherein at least one of said first stations is connected to one control element and at least one of the first stations being connected to a different control element, wherein, in a first mode, when a second station is in communication with a plurality of first stations controlled by the same control element, the first stations transmit identical control information to said second station and, in a second mode, when a second station is in communication with a plurality of first stations which are controlled by a plurality of different control elements, the control information transmitted by said first stations to said second station is different.

18. A network as claimed in claim 17, wherein said control information is used by said second station in said first and second modes to control the processing carried out by the second station in respect of signals received from said plurality of first stations.

19. A network as claimed in claim 17 or 18, wherein said control information is in accordance with a first coding in the first mode and in accordance with a second coding in the second mode.

20. A network as claimed in claim 17, 18 or 19, wherein said first coding has a first number of symbols available using a first number of bits and said second coding has a second number of symbols available using a second number of bits, wherein said first number of symbols is greater than said second number of symbols.

21. A network as claimed in claim 17, 18, 19 or 20, wherein the control information comprises a first number of code words in the first mode and a second number of code words in the second mode, said first number of code words being less than said second number of code words.

22. A network as claimed in claim 21, wherein the number of bits

defining the or each code word in the first mode is different to that of the or each code word in the second mode.

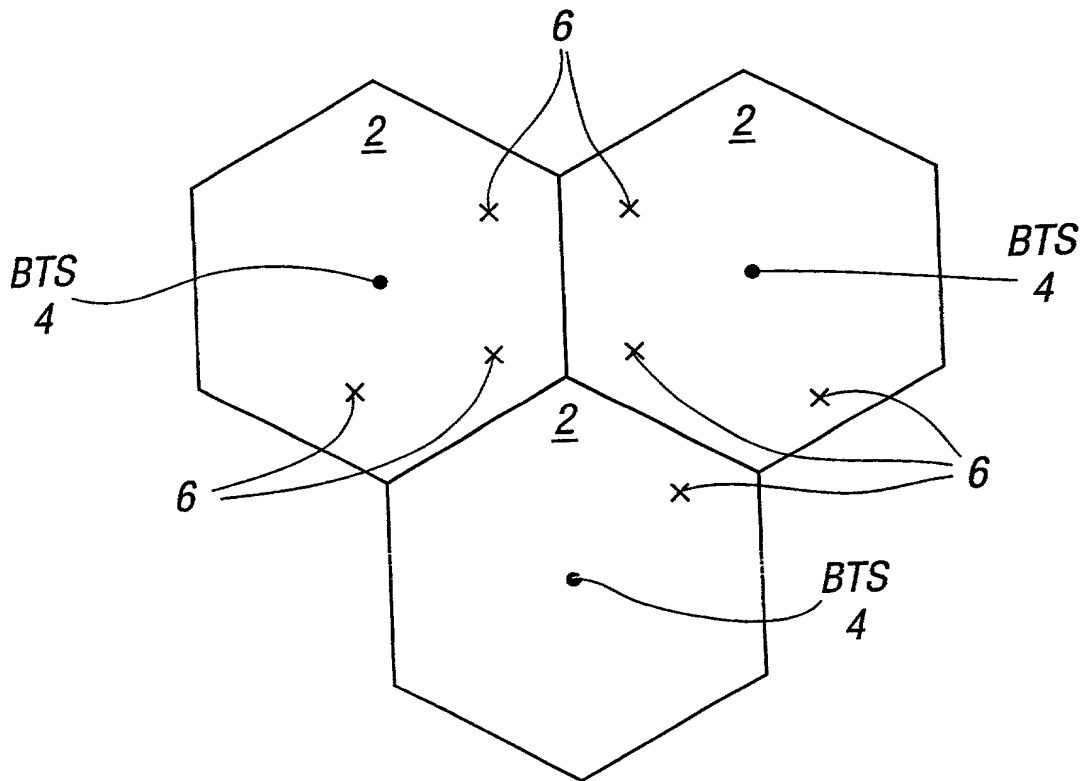
23. A method of transmitting signals from a plurality of first stations to the same second station, said method comprising the steps of:

transmitting first signals including first associated information and from one of said plurality of first stations to said second station;

transmitting second signals including second associated information, differing at least partially from said first associated information from another of said plurality of first stations to said second station, any data content of said second signals at least partially differing from any data content of said first signals; and

receiving at said second station said first and second signals, wherein said second station processes said first and second signals in accordance with the first and second associated information.

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FIG. 1

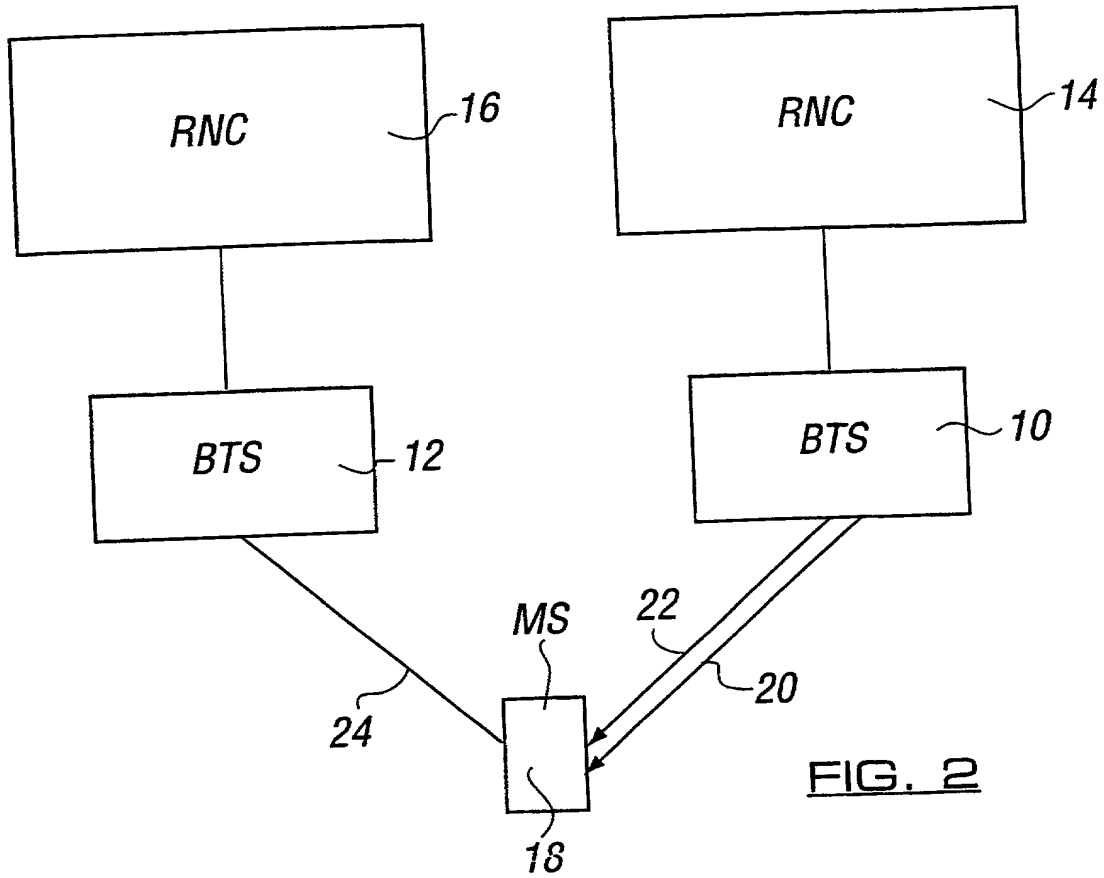


FIG. 2

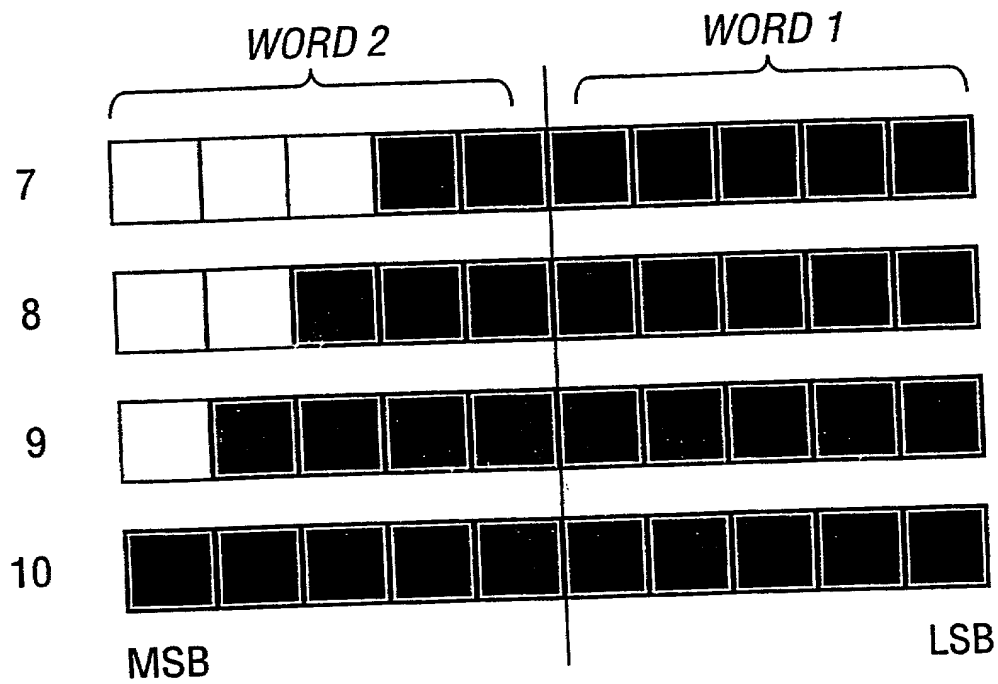


FIG. 3

COMBINED DECLARATION AND POWER OF ATTORNEY

(Docket Number)

915.399

As a below named inventor, I hereby declare that:

- my residence, post office address and citizenship are as stated below next to my name;
- I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: Method for Transmitting Signals from a Plurality of Base Stations to a Mobile Station
- the specification of which is attached hereto unless the following box is checked: ☒. If the box is checked,

the application was filed on November 13, 2001

as U.S. Application Number 10/009,355

or PCT International Application Number

and was amended on (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR §1.56.

I hereby claim foreign priority benefits under 35 U.S.C. §119(a)-(d) or §365(b) of any foreign application(s) for patent or inventor's certificate, or §365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application			Priority Not Claimed
PCT/EP00/03699 (Application Number)	EP (Country)	26 April 2000 (Day/Month/Year Filed)	<input type="checkbox"/>
(Application Number)	(Country)	(Day/Month/Year Filed)	<input type="checkbox"/>

To the extent permitted by rule or law, I hereby incorporate by reference the Prior Foreign Application(s) listed above.

I hereby claim the benefits under 35 U.S.C. §119(e) of any United States provisional application(s) listed below:

(Provisional Application Number)	(Day/Month/Year Filed)
(Provisional Application Number)	(Day/Month/Year Filed)

I hereby claim the benefit under 35 U.S.C. §120 of any United States application(s), or §365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. §112, I acknowledge the duty to disclose information which is material to patentability, as defined in 37 CFR §1.56, which became available between the filing date of the prior application and the national or PCT International filing date of this application.

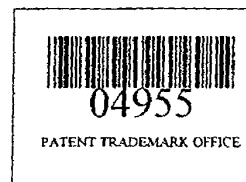
(Application Number)	(Day/Month/Year Filed)	(Status--patented, pending, abandoned)
(Application Number)	(Day/Month/Year Filed)	(Status--patented, pending, abandoned)

The undersigned hereby authorizes the U.S. firm of Ware, Fressola, Van Der Sluys & Adolphson LLP to accept and follow instructions from the English firm of Page White & Farrer as to any action to be taken in the U.S. Patent and Trademark Office regarding this application without direct communication between the U.S. firm and the undersigned. In the event of a change in the persons from whom instructions may be taken, the U.S. firm will be so notified by the undersigned.

I hereby appoint the attorney(s) and/or agent(s) assigned to the customer number listed below, as may from time to time be amended, belonging to the U.S. firm of Ware, Fressola, Van Der Sluys & Adolphson LLP, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

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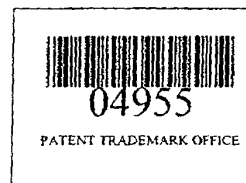
4955



Address all telephone calls to: Ware, Fressola, Van Der Sluys & Adolphson LLP at (203) 261-1234. Address all correspondence to: Alfred A. Fressola

Customer Number

4955



I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Residence	Citizenship
Post Office Address:	

Full name of third inventor (given name, middle initial, FAMILY NAME(S) IN UPPER CASE)	
Inventor's Signature	Date
Residence	Citizenship
Post Office Address:	

☐ Additional inventors are being named on separately numbered sheets attached hereto.

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